

PRELIMINARY REMARKS

The applicants acknowledge the Examiner's thorough examination of the subject application and request reconsideration and reexamination in light of the preceding amendments and the following remarks.

The Examiner rejects claim 23 under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification. The Examiner also rejects claims 1-3, 5, 7-8, 15, 17-18, and 22-23 under 35 U.S.C. §102(b) as being anticipated by White *et al.* (U.S. Patent No. 5,218,988). The Examiner also rejects claim 4-6 and 23 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over White *et al.* The Examiner also rejects claims 11, 24, and 25 under 35 U.S.C. §103(a) as being unpatentable over White *et al.* The Examiner also rejects claims 8-10, 18-19, 22 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over White *et al.* as applied to claims 1 and 17, and further in view of Bowers.

As shown above under AMENDMENT D, the applicants have cancelled claims 1-25 so the Examiner's rejection of the above claims is now moot.

The Examiner relies on the combination of White *et al.* in view of Bowers for the rejection of claims 26-30 under 35 U.S.C. §103(a). The Examiner states that Bowers teaches providing a known volume of liquid 55 in Fig. 7 on SAW resonator 52 in order to measure the level of non-volatile residue in the liquid.

The method of measuring the concentration of particles in a solution as claimed by the applicants in claim 26 includes the steps of: 1) depositing a measured quantity of the solution on a sensor having a membrane layer; 2) allowing the solution to evaporate until the particles remain on the membrane layer; 3) driving the membrane layer at a reference

resonant frequency; 4) detecting the shift in frequency of the membrane layer due to the mass of the particles; 5) determining the mass of the particles based on the shift in frequency; and 6) based on the measured quantity of the solution and the mass of the particles, automatically calculating the concentration of the particles in the solution.

Nowhere in the disclosure of Bowers is there any teaching, suggestion, or disclosure of depositing a measured quantity of the solution on a sensor having a membrane layer in order to detect the concentration of particle in the solution as claimed by the applicants in claim 26. Instead, Bowers teaches using a sample fluid which is a solvent, cleaning fluid, or isopropanol useful in semiconductor integrated circuit fabrication which is supplied by a bulk containment vessel under pressure. *See Col 14, lines 19-25.* Cleaning solvents and isopropanol used in semiconductor integrated circuits as disclosed by Bowers are not the same as the claimed measured quantity of solution used to detect the concentration of the particles in the solution which is allowed to evaporate until the particles of solution remain on the membrane layer, as recited in applicants claim 26. Moreover, the use of bulk containment vessels under pressure of Bowers clearly teaches away from depositing a measured quantity of solution as recited in applicants' claim 26.

Furthermore, nowhere in the entire disclosure of Bowers or White *et al.* is there a teaching, suggestion, or disclosure of automatically calculating the concentration of the particles in the solution as recited in applicants' independent claim 26.

Applicants' claim 27 refines claim 26 by reciting the measured quantity of the solution is deposited on a flexural plate wave device and similarly automatically calculates the concentration of the particles in solution.

The concentration detection system as claimed by the applicants in claim 28

includes: 1) a sensor having a membrane layer, the membrane layer for receiving a substance thereon; 2) an oscillator for driving the membrane layer at a reference resonant frequency; 3) a solution deposition device for delivering a known quantity of a solution containing particles to the membrane layer; 4) a transducer for detecting the change in frequency of the membrane layer due to the particles after the solution evaporates; and 5) a processor configured to automatically determine the mass of the particles based on the change in frequency, and to calculate the concentration of the particles in the solution based on the mass of the particles and the quantity of the solution deposited.

For the reasons stated above, Bowers does not teach, suggest, or disclose a solution deposition device for delivering a known quantity of a solution containing particles to the membrane layer, and a processor configured to automatically determine the mass of the particles based on the change in frequency and to calculate the concentration of the particles in the solution based on the mass of the particles and the quantity of the solution deposited as recited in applicants' claim 28. New claims 29 and 30 further refine claim 28 by reciting that the sensor is a flexural plate wave device.

Accordingly, the combination of White *et al.* in view of Bowers does not disclose each and every element of applicants' claims 26-30, namely, depositing a measured quantity of the solution on a sensor having a membrane layer and automatically calculating the concentration of the particles in the solution, a solution depositing device for delivering a known quantity of solution containing particles to a membrane layer, and a processor configured to automatically determine the mass of the particles in solution and to calculate the concentration of the particles in the solution based on the mass of the particles and the quantity of the solution deposited.

Accordingly, claims 26-30 are clearly allowable and patentable under 35 U.S.C. §103(a) over White *et al.* in view of Bowers.

The Examiner also rejects claim 16 under 35 U.S.C. §103(a) as being unpatentable over White *et al.* in view of Ballato. The Examiner further rejects claims 1, 7-8, 15, 17-18, and 22-23 under 35 U.S.C. §102(e) and (b) as being anticipated by Takeuchi *et al.*, claim 11 under 35 U.S.C. §103(a) as being unpatentable over Takeuchi *et al.*, claim 16 under 35 U.S.C. §103(a) as being unpatentable over Takeuchi *et al.* in view of Ballato, and claims 8-10, 18-19, 22, 26, and 28 under 35 U.S.C. §103(a) as being unpatentable over Takeuchi *et al.* in view of Bowers.

As stated above, the applicants have cancelled claims 1-25, therefore the rejection of claims 1, 7-10, 11, 15-19, 22 and 23 is now moot.

With regard to the rejection of claims 26 and 28 under 35 U.S.C. §103(a) as being unpatentable over Takeuchi *et al.* in view of Bowers, as disclosed above, Bowers does not teach, suggest or disclose depositing a measured quantity of the solution on a sensor having a membrane layer and automatically calculating the concentration of the particles in the solution as recited in applicants' claim 26. Bowers also does not teach, suggest, or disclose a solution deposition device for delivering a known quantity of a solution which contains particles to a membrane layer and a processor configured to automatically determine the mass of the particles in solution and to calculate the concentration of the particles in the solution based on the mass of the particles and the quantity of the solution deposited as recited in applicants' independent claim 28.

Therefore, the combination of Takeuchi *et al.* in view of Bowers does not disclose each and every elements of the applicants' invention as recited claims 26 and 28.

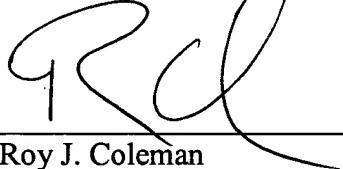
Accordingly, claims 26 and 28 are clearly patentable and allowable under 35 U.S.C. §103(a) over Takeuchi *et al.* in view of Bowers.

The applicants have added new claims 31-42 which depend from allowable claim 28. Accordingly, new claims 31-42 are allowable and patentable.

Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that the application is in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Preliminary Amendment is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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